CHAPTER 6. Birds at Plum Island: A comparison of present and historical observations

6.1. Background

The Plum Island Sound ecosystem is a particularly valuable and world-renowned habitat for migratory birds. During the 1940s, the United States Fish and Wildlife Service (USFWS) began acquiring land on Plum Island to create a wildlife refuge. Today, the Parker River National Wildlife Refuge (PRNWR) includes over 1,850 hectares of protected salt marshes, tidal flats, barrier beach, and upland areas on Plum Island and the mainland. More than 300 species of birds have been recorded on the Refuge, many during spring and fall when large numbers of migratory birds stop over to feed and rest (USFWS, 1990).

In addition to the actual federal refuge itself, some adjacent areas in the region contribute to the overall vitality of the region for wildlife. The tidal flats (Joppa Flats) near the mouth of the Merrimack River in Newburyport, just north of the Refuge, are a major regional migration stopover for shorebirds, particularly in late summer and fall, and for wintering waterfowl (Veit and Peterson, 1993). Two state parks, Sandy Point and Salisbury Beach, contain barrier beaches and salt marshes that are also attractive to birds and other wildlife. Important sections of the salt marshes and uplands along the western shore of Plum Island Sound and the Parker River have been designated as state wildlife management areas. The combination of large acreages of protected land and strategic location along the Atlantic flyway make the greater Plum Island Sound region a magnet for birds (and birders).

Despite the recognized importance of the Plum Island Sound ecosystem to wildlife and the large numbers of people who visit the area to observe birds, little data exist on the historical trends in bird numbers for this area. National Audubon Christmas Bird Counts and winter waterfowl surveys conducted by the Massachusetts Division of Fisheries and Wildlife provide some long term information. Since the late 1980s, members of the Brookline Bird Club, in cooperation with staff biologists at the Refuge, have carried out weekly surveys of waterfowl, raptors, and shorebirds during migration, and biweekly surveys at other times of the year. PRNWR personnel have recently been monitoring brood success of waterfowl, and carrying out yearly monitoring of tern populations as part of a statewide survey of coastal nesting birds. The Eastern Massachusetts Hawk Watch Association carries out weekend monitoring of raptors flying over Plum Island during spring hawk migration season.

As part of the Plum Island Sound Minibay project, the Massachusetts Audubon Society (MAS) evaluated historical and current information on the use of Plum Island by water birds, waterfowl, shorebirds, gulls and terns.

6.2. Methods

Massachusetts Audubon used two major sources of data for the evaluation of birds on Plum Island from the 1930s through the 1990s. For the 1990s they analyzed the results of bird surveys conducted by the Brookline Bird Club in the Refuge during 1990, 1991, and 1993. These surveys were conducted weekly during migration periods (March to May and mid-July to October), and biweekly during the remainder of the year. Each survey included sightings made from several viewpoints along Refuge Road as well as the North Pond, Bill Forward Pool, Crossfarm Hill and the Stage Island area. The Parker River National Wildlife Refuge and the Brookline Bird Club made the results of their bird surveys available. The journals of the noted Massachusetts state ornithologist, Ludlow Griscom, provided the historical comparison. Griscom kept notes on the birds he observed on field trips throughout the state during the 1930s, the 1940s and the 1950s. Many of Griscom's weekly trips were to Essex County and Plum Island. Griscom's journals are currently housed in their original form at the Peabody/Essex Museum in Salem, Massachusetts.

There are some obvious limitations to the data available from the 1930s through the 1950s, since they were not collected in a systematic manner and did not include exact locations on Plum Island. Many of the entries in Griscom's journals are noted as Essex County but do not specify whether or not the sightings were recorded on Plum Island. Only those sightings clearly attributed to Plum Island were included in the evaluation. We do not know, however, if he included a noted tern colony on Woodbridge Island in the Merrimack River in his surveys for Plum Island. In addition, there are much less data available for the 1930s through 1950s than for the 1990s. During the 1940s, coverage of coastal birds by Griscom was probably lower because of the difficulty of accessing parts of the coast during World War II (W. Petersen, pers. comm.). The data for the 1990s are more comprehensive since the surveys were carried out regularly and sightings were clearly attributed to Plum Island. Table 1 compares the total number of surveys conducted each month from the 1930s to the 1950s, to the total number of surveys conducted during the 1990s.

Based on an evaluation of the adequacy of data, four shorebirds (black-bellied plover, greater yellowlegs, semipalmated plover, and semipalmated sandpiper), six waterfowl (American black duck, common loon, green-winged teal, mallard, red-breasted merganser, and white-winged scoter), one gull (Bonaparte's gull), and one tern (common tern) were included in the analysis. Since most of these species are migratory and are therefore not present at Plum Island all the time, the highest number of birds observed each year at Plum Island at any one time was used as an estimate of their numbers at Plum Island for that year. By examining the results of several bird surveys, averages for the maximum number of birds observed in Plum Island Sound during the 1930s, the 1940s, the 1950s and the 1990s were calculated. Comparisons were then based on the three highest numbers (peak migration numbers) during each decade for each species.

6.3. Results

The comparison between bird numbers recorded in Griscom's 1930-1950s journals and the more recent data from the PRNWR suggests that historical changes have occurred in the populations of several species of birds at Plum Island (Table 6.1). Because there are less data available during the 1930s to 1950s than during the 1990s, any decreases in bird populations over time are likely more significant than our analysis demonstrates since there is less chance of getting a higher peak count with a smaller sample size. This is reflected in the higher coefficients of variations for the three decades of historical data collected by Griscom compared to the 1990s.

Table 6.1. Average of the three highest numbers of birds observed at one time at Plum Island during the indicated decade. Numbers are means $\pm$ 1 standard deviation. NR indicates that no observations from Plum Island were recorded by Griscom of that species during that decade.

See next page for Table 6.1.

6.31. Loons and waterfowl

6.311. Common Loon (Gavia immer)

Common loons are common migrants and winter residents along the coast of Massachusetts. Loons appear to be higher in numbers since the 1950s than in the 30s and 40s. The average peak number of common loons recorded has varied from a low of 7 in the 1940s to a high of 55 in the 1990s.

6.312. Green-winged Teal (Anas crecca)

Green-winged teal are commonly found in the coastal marshes of Plum Island and have been confirmed as breeders there since 1954. The average peak number of green-winged teal observed on Plum Island has increased greatly since the 1940s when a peak average of 20 were seen on the Island. During the 1950s, a peak average of 117 green-winged teal were seen on Plum Island and in the 1990s an average peak of 462 were seen.

6.313. American Black Duck (Anas rubripes)

American black ducks are present throughout the year in the salt marshes of Plum Island Sound. One of the main reasons the PRNWR was established was to protect the breeding and wintering habitat of American black ducks. The number of black ducks on Plum Island has been steadily declining since the 1940s when a peak average of 1,800 were observed. During the 1950s, the average peak number of American black ducks

Table 6.1. Average of the three highest numbers of birds observed at one time at Plum Island during the indicated decade. Numbers are means ± 1 standard deviation. NR indicates that no observations from Plum Island were recorded by Griscom of that species during that decade.

Bird Species	**1930s**	**1940s**	**1950s**	**1990s**
Common Loon	13 (±9)	7 (±5)	49 (±32)	55 (±26)
Green-winged Teal	NR	20 (±26)	117 (±58)	680 (±122)
Black Duck	567 (±404)	1800 (±1513)	1552 (±1296)	1426 (±272)
Mallards	2 (±1)	3 (±1)	113 (±162)	209 (±90)
Red-breasted Merganser	21 (±25)	NR	72 (±68)	151 (±33)
White-winged Scoter	1400 (±1442)	684 (±1140)	267 (±208)	417 (±102
Black-bellied Plover	392 (±527)	1183 (±898)	267 (±208)	254 (±32)
Semipalmated Plover	533 (±451)	227 (±323)	NR	989 (±102
Greater Yellowlegs	217 (±247)	310 (±426)	22 (±6)	118 (±13)
Semipalmated Sandpiper	4500 (±4924)	3000 (±1803)	4000 (±5196)	1571 (±91)
Bonaparte's Gull	150 (±132)	142 (±63)	138 (±146)	215 (±112
Common Tern	600 (±361)	NR	267 (±208)	61 (±10)
Avg. Coefficient of Variatio	91.2	94.6	84.8	23.5

recorded on Plum Island declined to 1,552, and in the 1990s the number decreased to 1,048. The U.S. Fish and Wildlife Service (USFWS), which has been monitoring black duck populations in the marshes of Plum Island since the 1950s, has also documented a steady decline in American black duck populations since the early 1960's and has also noted declines throughout the northeast (USFWS as cited in Veit & Petersen, 1993). The decline of black ducks may be in part related to the growth in mallard populations. It is thought that interbreeding between black ducks and mallards has led to a reduction in the number of genetically pure black ducks.

6.314. Mallard (Anas platyrhynchos)

Mallards are known to breed in the marshes of Plum Island Sound (Veit & Petersen, 1993). The average peak number of mallards on Plum Island has increased dramatically between the 1930s and the 1990s. The sharpest increase took place between the 1940s and 1950s when mallards observed in Plum Island Sound rose from an average peak of fewer than 10 during the 1930s and 1940s to 113 during the 1950s. The number of mallards seen at Plum Island has continued to increase to an average peak of 133 observed during the 1990s. This trend is consistent with a documented increase in mallards in the state of Massachusetts since approximately 1910. Mallards have thrived and been attracted to freshwater ponds in many city and town parks as a result of feeding by humans.

6.315. Red-breasted Merganser (Mergus serrator)

Red-breasted mergansers are often observed at Plum Island as migrants and winter residents, with peak populations from late March to May and October through November. These diving ducks feed on small fish such as silversides that they catch with their serrated bills. The average peak number of red-breasted mergansers observed at Plum Island has steadily increased since the 1930s.

6.316. White-winged Scoter (Melanitta fusca)

White-winged scoters are migrants and winter residents along the coast of Massachusetts. The average peak number of white-winged scoters using Plum Island Sound dropped sharply and steadily from 1,400 during the 1930s to 684 in the 1940s and then down to 267 during the 1950s. The average peak number of white-winged scoters observed in the Sound during the 1990s was 417, slightly higher than Griscom's numbers seen during the 1950s. This decline may be related to changes in breeding habitat in the boreal and Arctic regions (Veit & Petersen, 1993).

6.32. Shorebirds

6.321. Black-bellied Plover ((Pluvialis squatarola)

Black-bellied plovers are a common migrant along the Massachusetts coast. During the 1940s, the peak number of black-bellied plovers recorded on Plum Island by

Griscom tripled in size from what it had been in the 1930s to almost 1,200. It then declined to roughly 250 in the 1950s and 1990s. Statewide trends indicate that the population of black-bellied plovers has been relatively stable since the 1930s (Veit & Petersen, 1993).

6.322. Semipalmated Plover (Charadrius semipalmatus)

Semipalmated plovers are another common coastal migrant. The average peak number of semipalmated plovers observed on Plum Island have ranged from 533 during the 1930s to 227 during the 1940s and then to almost 1000 during the 1990s.

6.323. Greater Yellowlegs (Tringa melanoleuca)

Greater yellowlegs are primarily birds of mud flats and salt marshes. Some individuals may spend winters in Massachusetts and others move as far south as South America depending on the weather. The peak number of greater yellowlegs observed on Plum Island has decreased from an average of 217 during the 1930s to 118 during the 1990s. This has not been a steady decline; during that time period, the observations of greater yellowlegs on Plum Island rose to 310 during the 1940s and then dropped to only 22 during the 1950s. One suggestion is that the decline in harvesting salt marsh hay has made the area less desirable to greater yellowlegs since they prefer short grass meadows (W. Petersen, pers. comm.).

6.324. Semipalmated Sandpiper (Calidris pusilla)

Semipalmated sandpipers are the most numerous shorebird in Massachusetts, where they occur primarily in extensive tidal flat areas during migration. The average peak number of semipalmated sandpipers recorded on Plum Island has declined significantly from about 4,500 during the 1930s to approximately 1,500 in the 1990s. Prior to the 1990s, the peak number of semipalmated sandpipers observed in the Sound remained high with about 3,000 seen during the 1940s and 4,000 in the 1950s. These data are consistent with a documented decrease in the number of semipalmated sandpipers that spend time in Massachusetts (Veit & Petersen, 1993). It's possible that a shift in migration routes rather than a population decline has occurred since more than three to four million semipalmated sandpipers have been estimated during July in the Bay of Fundy, New Brunswick, Canada (Harrington and Morrison as cited in Veit & Petersen, 1993).

6.33. Gulls/Terns

6.331. Bonaparte's Gull (Larus philadelphia)

Bonaparte's gulls are common migrants and winter residents in Massachusetts. They move about continuously in response to the availability of food during their non-breeding season. The average peak number of Bonaparte's gulls observed in Plum Island

Sound was slightly higher in the 1990s compared to earlier decades. This may represent fluctuations in migration patterns rather than an actual decline. These fluctuations are evident in the numbers of Bonaparte's gulls observed during the 1990s when the peak per year ranged from 21 to 215.

6.332. Common Tern (Sterna hirundo)

Common terns breed along the coast of Massachusetts and winter in Central and South America. The peak number of common terns observed at Plum Island has decreased significantly since the 1930s when an average of 600 were observed on the Island. During the 1950s, an average peak of 267 were seen at Plum Island, and only a maximum of 61 were observed during the 1990s. This trend is consistent with a significant decline in the population of common terns in Massachusetts since 1910 (Veit & Petersen, 1993). This decline has been attributed in large part to the massive expansion of herring and great black-backed gull populations. The 1930s data for common terns may underrepresent the actual number of birds using Plum Island at the time since Griscom conducted few surveys for common terns during that period, and did not conduct any surveys during some of the peak months that common terns are in Massachusetts.

6.4. Conclusions

Trends and changes in bird numbers and migratory patterns have been inferred by comparing data from the recent bird surveys at the Parker River Wildlife Refuge to data from the recorded field observations from the 1930s through 1950s of the noted ornithologist, Ludlow Griscom who was active. During the period between the 1930s and the 1950s, the average peak numbers of three out of four shorebird species evaluated (greater yellowlegs, semipalmated sandpipers, and black-bellied plovers) decreased at Plum Island, while semipalmated plovers remained relatively stable. In contrast there were greater recorded numbers of three out of five waterfowl species in the 1990s compared to the earlier observations. Mallards, green-winged teal, red-breasted mergansers, and common loons observed in the Plum Island Sound showed overall increases, while white-winged scoters and American black ducks declined. The average peak number of Bonaparte's gulls using the Sound has increased slightly with large fluctuations on a year-to-year basis. The peak number of common terns observed during this period has declined. Loons showed no obvious trends.

It is difficult to attribute population trends for the birds measured in this report to specific local changes since most of these birds are migratory. In general, there is little evidence that Plum Island Sound as a habitat for birds has changed significantly between the 1930s and today. We do know that ditches, which have been dug throughout the marshes to reduce mosquito breeding habitat, have reduced the number of salt pannes available to birds, and that humans have affected mallard populations by feeding them. We suggest that the changes in the average peak numbers of birds in Plum Island may be related to regional and global factors such as the following.

- Changes in the adequacy of breeding habitat in other regions may impact the bird species that come to Plum Island Sound during the non-breeding season.

- Shifts in the number and type of fish found in Plum Island Sound caused by overfishing in the Gulf of Maine and other factors may have increased some of the food species available to birds in the Sound.

- Migratory birds often shift their migration patterns in response to weather conditions and the availability of food.

In addition to identifying historical trends for birds recorded at Plum Island, this analysis provides valuable baseline data about the birds found in the Sound today. This information can be used in the future to evaluate changes in the use of this important habitat by birds.